DOCUMENT RESUME

ED 308 603 EA 021 101

AUTHOR Kemple, James J.
TITLE The Career Paths of Black Teachers: Evidence from North Carolina.
PUB DATE Mar 89
NOTE 34p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, March 27-31, 1989).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Black Teachers; Career Choice; Career Development; *Career Planning; Elementary Secondary Education; Minority Group Teachers; Teacher Employment; *Teacher Persistence; *Teaching (Occupation)
IDENTIFIERS *North Carolina

ABSTRACT

This paper studies the variables that may be related to the length of time that black teachers stay in teaching and, if they do leave, to whether or not they return. Specifically studied are the career paths of 2,535 black teachers who began their careers in North Carolina between 1974 and 1982. Used to predict the timing of both an exit from teaching and a return to teaching is information on each teacher's calendar year of entry, gender, age at entry, and subject matter specialty. Discussed are the changes in the career patterns of black teachers and the relationship between opportunity costs and the likelihood of staying in, leaving, or returning to teaching. The study's analytic method is summarized and the key terms defined. Findings suggest that the majority of teachers in the sample tended to stay in teaching once they entered and are reasonably likely to return to teaching if they leave. The pattern identified appears to have changed slightly since the mid-1970's, and there is a disproportionate drain on the black teachers who are most in demand both inside and outside the teacher labor market. Appended are 25 references, two data tables, and six data figures. (SI)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED308603

The Career Paths of Black Teachers:

Evidence from North Carolina

James J. Kemple

Graduate School of Education, Harvard University

March, 1989

Paper presented at the Meeting of the American Educational Research Association, San Francisco, CA, March, 1989

I would like to thank Richard Murnane for his continued support and for helpful comments on earlier drafts of this paper. I would also like to thank John Willett for his help with the research on which this paper is based. Finally, I would like to thank the North Carolina Department of Public Instruction for providing the data.

EA 021 101

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

James Kemple

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Since the mid-1970s, the percentage of Black and other minority educators in the teaching force has declined dramatically while the minority student population in the U.S. has increased at an unprecedented rate (Baratz, 1986). Several recent studies characterize the causes for the growing shortage of minority teachers as "leaks" in the educational and career pipelines. The leaks have taken at least three forms: (1) declining minority participation in higher education; (2) increasing numbers of the most talented minority undergraduates and graduates choosing more lucrative and prestigious occupations; and (3) restricted access to teacher certification in the form of standardized tests that affect minorities disproportionately. (Darling-Hammond, 1984; Goertz and Pitcher, 1985; Baratz, 1986; Carnegie Task Force on Teaching as a Profession, 1986; The Holmes Group, 1986; Darling-Hammond, Pittman, and Ottinger, 1987; and Graham, 1987). Murnane and Schwinden (1989) exposed a fourth leak in the pipeline: forty five-percent of the Black college graduates who obtained certification to teach in North Carolina did not enter teaching in North Carolina.

The research reported in this paper represents the next step in this line of research. It examines variables that may be related to the length of time that Black teachers stay in teaching and, if they do leave, whether they return. Specifically, I studied the career paths of 2535 Black teachers who began their careers in North Carolina between 1974 and 1982.[1]

I used information about each teacher's calender year of entry, gender, age-at-entry, and subject matter specialty, to predict the timing of both an exit from teaching and a return to teaching if they occurred before or during the 1985-86 school year.[2]

My findings indicate that over two-thirds of these teachers stayed in teaching through the 1985-86 school year regardless when they started. In addition, over one-third of the 782 teachers who left before the 1984-85 school year, returned to teaching before the 1985-86 school year. This "good news" is tempered, however, by the fact that the likelihood of leaving teaching, among this group, has increased since the mid-1970s and that teachers with highest "opportunity costs" -- defined as the salaries that teachers forego by teaching instead of pursuing alternative career opportunities -- also tended to be the most likely to leave teaching.

These findings provide evidence to suggest that as Black men and women win greater access to other professions Black teachers may shorten their teaching careers and may be less likely to return once they leave. This is particularly important because the number of beginning Black teachers is so small and declining; even minor increases in attrition will have large influences on the overall representation of Black men and women in the teaching force. As a result, a more focussed and systematic investigation of Black teachers' career patterns is necessary to get a complete picture of the growing shortage of Black teachers.

The paper is organized around two questions. First, I

discuss changes in the career patterns of Black teachers by addressing the broad question: Do the patterns of exits from and returns to teaching differ between Black teachers who began their careers in the mid-1970s, the peak of minority representation in the teaching force, and those who began their careers in the late 1970s and early 1980s, a period when the number of new minority teachers was in sharp decline? Second, I discuss the relationship between opportunity costs and the likelihood of staying in, leaving, and returning to teaching by addressing the question: Do the career patterns of Black teachers differ by the five subject specialties represented in the sample: elementary education, biology, math, English, and social studies?

Before moving on to discuss the key findings, I will summarize the analytic method I used to investigate both the length of first teaching spell and the probability of returning to teaching after a career interruption. I will also define several key terms that I use to describe my findings.

ANALYTIC METHOD: EVENT HISTORY ANALYSIS

This research first examines teacher attributes that help predict the consecutive number of years that Black teachers taught in North Carolina public schools. Because time is the dependent variable, I used event history analysis as my primary analytic technique. Broadly defined, an event history is "a longitudinal record of when events happen to a sample of

individuals" (Allison, 1984). In particular, my research attempts to predict when teachers were likely to leave teaching. A problem arises, however, from the fact that my data end with the 1985-86 school year when nearly two-thirds of the teachers in my sample were still teaching. Because I do not know how long they taught these teachers are said to be "right-censored."

By transforming the dependent variable from "length of time in teaching" to a "hazard function" I was able to include censored teachers in my analyses. I defined the hazard probabilities that make up the hazard functions as the probability that a teacher left teaching after a particular year in her or his career, given that she or he taught continuously until that year (paraphrased from Allison, 1984, p. 16).[3] The hazard probabilities, in turn, allowed me to estimate "survival functions" which describe the probability of staying in teaching beyond a particular year.

Conceptually hazard functions can be thought of as plots that map fitted hazard probabilities against each year of potential first spell duration and help describe the "risk" of leaving teaching at each year. The fitted hazard plots enabled me to identify whether, for example, the first year of teaching was particularly risky or whether the second year was more risky than the third, and so on.

Survival functions can be thought of as plots that display the estimated probability that a teacher will survive beyond year one, year two, year three, and so on. The key statistics I used

to summarize the results of the survival plots are "seven year survival probabilities." This represents the estimated probability of teaching for more than seven years.

When I conducted my analyses of returning to teaching I applied event history analysis in essentially the same manner as I did when investigating differences in length of first teaching spell. Because this second investigation focused on length of career interruption, however, I had to redefine the hazard and survival functions. The hazard functions describe the probability of returning to teaching for each year of career interruption. They tell, for example, whether teachers were especially likely to return after the first year of interruption, or whether the second year held a higher probability of return than the third, and so on.

Rather than use survival functions to describe length of career interruption I used plots that depict the total probability of returning to teaching. These plots describe the probability of returning to teaching <u>within</u> a specified number of interruption years. This probability is equivalent to one minus the survival probability for a given year and I will refer to it as the total probability of returning to teaching. In short, the plots depict the total likelihood that a teacher returned within two years after leaving teaching, within three years, and so on. The primary statistic I will use to summarize the "total probability of return" plots, is the probability of returning to teaching within four years.

COMPARING THE CAREER PATHS OF TEACHERS WHO ENTERED IN THE MID-1970S WITH THOSE WHO ENTERED IN THE LATE 1970S AND EARLY 1980S

The effect of entry year allowed me to estimate indirectly the impact on Black teachers' careers of two changes that occurred in North Carolina between 1974 and 1986. One of these was a decline in student enrollment during the late 1970s and early 1980s. The other was a dramatic decline in the number of new Black teachers. I will first discuss differences across entering cohorts in the length of first teaching spell and then address differences in the probability of returning to teaching.

Length of first teaching Spell. Teachers who began their careers between 1978 and 1982 were much more likely to leave teaching than those who entered between 1974 and 1977. Figure 1 depicts the fitted hazard functions for each cohort.[4] Note first that the hazard functions for each cohort follow the same general pattern found in previous research. That is, the probability of leaving teaching is highest in the first few years and then declines.

---

insert Figure 1 about here

Despite the student teaching experiences that are usually required of teacher trainees, first year teachers have almost no

in-depth experience at organizing and managing their own classroom. Many new teachers find the initial experience of lesson planning, paper grading, disciplining and so on, for a total of up to 150 students per day, overwhelming. Some may become frustrated enough, even after the first year, to reevaluate their decision to teach and then move to other careers.

While the probability of leaving teaching appears to be relatively high for those who were just starting their careers, particularly among teachers from the 1978-82 cohorts, the long term "survival" of this sample of teachers represents a key finding of this research. Compared to other studies (Charters, 1970; Grissmer and Kirby, 1987; Murnane, Singer, and Willett, 1988, 1989), which focus primarily on White teachers, my sample of Black teachers from North Carolina are remarkably long-lived. These studies found that the teachers they studied had median lifetimes (the time by which 50% of the teachers left teaching) of five to seven years.

Figure 2 illustrates the fitted survival functions for each cohort group and for each year of first spell duration. Among the most interesting findings of my research is that the estimated seven-year survival probabilities are .729 for teachers from the 1974-77 cohort and .641 for the eligible teachers from the 1977-82 cohorts. In other words, an estimated 73% of the 1974-77 cohort and 64% of the eligible teachers form 1977-82 cohort taught for at least seven years. In fact, an estimated

twelve years. This means that the median lifetime for the teachers in my sample will be almost twice that of the White teachers studied in previous research.

---

insert Figure 2 about here

Despite the general longevity of first teaching spells among the teachers in my sample, the dramatic change in career duration that appears to have occurred between the two entering cohorts raises serious questions about the supply of experienced Black teachers in North Carolina. Between 1978 and 1982, the number of first year teachers in my sample declined from 385 to 89. Figure 1 shows that during the same period, the estimated hazard probability was .135 for first-year Black teachers, .071 for second-year teachers, and .066 for third-year teachers. As illustrated in Figure 2, this means that an estimated 25% percent of each entering cohort between 1978 and 1982 left teaching within three years. Although this figure is still somewhat lower than previous findings for White teachers, the combination of declining new entrants and higher early attrition means that public school classrooms in North Carolina are being served by fewer and, in the long run, less experienced Black teachers.

Returning to teaching. Among the 782 teachers who left teaching

before the 1984-85 school year, those who originally entered between 1978 and 1982 were also the most likely to return. Teachers who began teaching in 1974 proved to be an anomaly, however, as they were by far the least likely to return from a career interruption.

Figure 3 displays a fitted hazard function for each group of entering cohorts.[5] Note that the probability of returning to teaching is highest after the first year of interruption. Also, the estimated probability of returning to teaching after five or more years is almost zero.

---

insert Figure 3 about here

Figure 4 displays the total fitted probabilities of returning to teaching for the three entering cohort groups. Recall that these probabilities represent the likelihood of returning to teaching <u>within</u> a particular number of years. Note that the estimated probability that teachers who entered between 1978 and 1982 would return <u>within</u> four years is .471. The comparable figure for teachers who began teaching between 1975 and 1977 is .308. This means that, although the likelihood of returning to teaching is quite high for both groups, teachers from the later cohort were 1.53 times more likely to return to teaching than those from the earlier cohort.

insert Figure 4 about here

Are these large differences in the estimated probability of return related to the differences in the estimated probability of leaving teaching? Recall that teachers who began their careers between 1978 and 1982 were less likely to teach for at least seven years than were those who started teaching between 1974 and 1977. One explanation for this difference may be that declining student enrollments in the late 1970s and early 1980s prompted large reductions in force (RIF) or teacher layoffs. If teachers from the later cohort intended to make teaching a long-term career, then the involuntary layoff may have been only a temporary interruption that would end when new positions opened or when enrollments began to rebound in the mid-1980s. This hypothesis is supported by the fact that these teachers were much more likely to return to the classroom after a short interruption.

When comparing the career patterns of teachers across cohorts, did the higher estimated probability of returning among teachers from the 1978-82 cohort offset the lower probability of staying in teaching in the first place? For an answer to this question, I calculated an estimate of the percentage of each cohort that was teaching, either continuously or through re-entry, seven years after they entered.

Consider the 1978-82 cohort first. An estimated 19.7% of the teachers left within three years and, of those, 47.1% returned within four years. This means that an estimated 9.3% of the original cohort entered and returned within seven years. Meanwhile, an estimated 61.9% taught continuously for at least seven years. Altogether, therefore, an estimated 71.2% of the original cohort was teaching seven years after entry. Among teachers from the 1974-77 cohort, an estimated 72.9% taught continuously for at least seven years and 4.4% left and returned within seven years making total of 77.4% who were teaching seven years after entry.[6]

The above experiment suggests that the higher probabilities of return did not offset the lower probabilities of staying in teaching for the 1978-82 cohort. This, in turn, suggests the difference among cohorts is not just due to temporary career interruptions that were prompted by teacher layoffs. Although retention rates have remained quite high, it appears that the career paths of Black teachers in North Carolina have taken a different form: since the mid-1970s, Black teachers have become more likely to leave teaching and never return.

One explanation for the difference between cohorts is that other social and economic forces changed the career choices of Black teachers more permanently. Some of these forces may have been the same ones that depressed the number of new Black teachers. For example, desegregation, equal employment opportunities, and affirmative action initiatives may have opened

opportunities to Black teachers that were not previously available. In other words, increased opportunity costs may be related to the increase in early exits form teaching. The relationship between subject specialties and career patterns discussed below may shed some light on this hypothesis.

COMPARING CAREER PATTERNS BY SUBJECT SPECIALTY

Estimates of teachers' career lengths, particularly as they pertain to shortages or surpluses at the state and district level, may be unhelpful at best or misleading at worst, if they do not differentiate among subject specialties. When school districts assess their need for teachers, they are interested in math teachers, English teachers, elementary school teachers and so on, rather than in "generic teachers." At the same time, high paying sectors of the labor market such as business and industry, place a premium on math and science training, compared to training in the humanities (College Placement Council, 1986). As a result, math and science teachers may leave the profession sooner than their colleagues in order to take advantage of these opportunities.

Subject specialty is an important consideration when estimating the number of Black men and women in the teaching force. Several studies have documented the dearth of Black men and women who major in math or the sciences in college or who become math and science teachers (Feistritzer, 1985; Darling-

Hammond, et al., 1987; Graham, 1987). These studies also suggest that many talented Black men and women, who might have entered teaching when other professions were closed to minorities, currently enter more lucrative and prestigious occupations. Finally, the shortage of entering Black teachers may be exacerbated if those who teach math and science leave the profession after only a few years in the classroom.

I first discuss the extent to which the length of first teaching spell among North Carolina's Black teachers differed across five subject specialties: elementary school, biology, math, English, and social studies. I then address differences across the subject specialties in the probability of returning to teaching. In each case, the effect of subject specialty interacted with individual demographic characteristics.

Length of first teaching spell. In addition to finding important differences in first spell length among the five subject specialties, I also found that the relationship between first spell length and subject differed by gender.[7] These differences can be seen most vividly by comparing Figures 4 and 5. Figure 4 represents the survival functions by subject specialty for women and Figure 5 represents the same survival functions for men.[8]

---

insert Figures 4 and 5 about here

The figures show that the largest gender differences occur

in math, where the seven-year survival probability is .489 for men and .692 for women, and biology, where the seven-year survival probability is .534 for men and .746 for women. In fact, male math and biology teachers had by far the lowest probability of remaining in teaching for at least seven years among all the subject/gender groups.

The effect of the gender-subject interaction on first spell duration is particularly important in this sample of teachers because men and women are unevenly distributed across the subject specialties. Table 1 lists number of teachers in this sample by subject and gender. Although men make up only 13.4% of the total sample, they make up 23.7% of the math teachers and 23.1% of the biology teachers. Because male math and biology teachers tend to leave earlier than their female counterparts, therefore, North Carolina can expect to lose more Black math and biology teachers than would be expected if gender were not taken into consideration. The opposite is true of social studies teachers. Here men made up 46.2% of the teachers and remained in teaching longer than their female counterparts.

---

insert Table 1 about here

The large subject differences may be explained by viewing subject specialty as an indicator of opportunity cost. The

gender differences within subjects, particularly math and biology, may be explained by the extent to which Black women have less access to alternative opportunities than Black men.

The College Placement Council (1986) provides information about the average starting salaries offered by business and industry for graduates with training in biology, mathematics and the humanities. For example, in 1980, the average starting salary, in 1987 dollars, offered by business to graduates with mathematics training was $25,000. The other comparable salaries were $20,000 for those with training in biology and $18,00 for those with training in the humanities. The College Placement Council also reported that the average starting salary for teachers was $15,400.

These salary differentials suggest that teachers with training in math or biology face a higher opportunity cost than those with training in elementary education, English, or social studies. As a result, math and biology teachers would be more likely to leave teaching than elementary school, English, or social studies teachers because the higher alternative salaries are more likely to outweigh the financial rewards found in teaching. While this may help explain the low survival probabilities among male math and biology teachers, it does not explain the opposite trend among females. There are at least two possible explanations for this gender difference. First, Black women math and biology teachers may not enjoy the same access to non-teaching opportunities as their male colleagues. Second, men

and women may respond differently to similar opportunity costs.

In the first case, Black women biology and math teachers may have access to fewer non-teaching opportunities because of job discrimination on the basis of both race and gender. It is widely documented that Black women are underrepresented and underpaid in many higher paying occupations in business, industry, and other areas of the service sector.

In the second case, the large gender differences in math and biology may be explained, in part, by the kind of benefits that women may expect to derive from teaching. For example, although more women with children are working than ever before, many of these women still maintain the primary childcare responsibilities. Teaching provides a ten-month school year and a shorter structured day than most businesses and thus, lends itself more easily to the dual role of mother and wage earner. For women, therefore, the opportunity costs measured by salaries in alternative occupations would be less likely to outweigh these nonpecuniary benefits of teaching.

Returning to teaching. Like the relationship between first spell length and subject specialty, the relationship between returning to teaching and subject specialty depended on gender. In this case, however, the interaction between subject specialty and gender also depended on the age at which a teacher began her or his career. In short, this represents a three-way interaction between subject specialty, gender, and entryage.

First, with regard to age at entry, the probability of returning to teaching differed most sharply between teachers who first entered teaching after age 23 and those who entered at age 23 or younger. Specifically, the younger entering teachers were less likely to return to teaching than those who entered at age 24 or older. Although there was some variation in the probability of returning to teaching among teachers over age 23, it was not enough to warrant a further subdivision of entryage.

Also, biology, math, English, and social studies teachers were equally likely to return to teaching. As a group, however, the high school subject teachers were less likely to return than elementary school teachers. As a result, I chose to distinguish teachers only by grade level (elementary vs. high school) when discussing subject differences.[9]

Table 2 lists the total probability of returning to teaching within four years for each entryage/gender/subject group.[10] Recall that these probabilities represent the probability that a teacher would return to teaching <u>within</u> four years.

---

insert Table 2 about here

Note first, the general contrast between elementary and high school teachers. For all but the men who began teaching at the age of 24 or older, elementary school teachers were more likely

to return to teaching within four years. In addition, the ratio of elementary to high school accumulated return probabilities is quite consistent across the two age groups for women. This is important because women elementary school teachers made up over 60% of the sample. Among women who entered at age 24 or older, elementary school teachers were 1.349 times more likely to return to teaching within four year than women high school teachers. The analogous figure for women who entered at age 23 or younger is 1.337.

Finally, recall from Figures 4 and 5 that elementary school teachers were less likely to leave teaching than teachers from any of the secondary school subjects. In addition, recall that male biology and math teachers were by far the most likely to leave teaching. Table 2 suggests that, in general, those who were the most likely to leave were among the least likely to return and that those who were the least likely to leave were among the most likely to return. This provides some evidence that teachers who may be drawn away from teaching because of higher opportunity costs (as estimated by subject specialties) may be drawn away permanently, while those who may leave for other reasons, are more likely to return.

CONCLUSION

The research findings reported in this study provide some of the first concrete evidence on the career patterns of Black teachers. As such, it permits some insight into both the impact

that these career patterns have on the representation of Black teachers in the teaching force and into the extent to which these career patterns have changed since the mid-1970s.

The findings reported in this study represent a "good news/bad news" story about the changing representation of Black men and women in the teaching force. The "good news" is that the majority of teachers in this sample tend to stay in teaching once they enter, and are reasonably likely to return to teaching if they leave.

In general, the "good news" suggests that the primary efforts at increasing the representation of Black teachers should focus on the early stages of the educational pipeline: better elementary and secondary school educational opportunities; greater access to higher education; better incentives to pursue education as a major; and more support services in teacher education programs. If the career patterns identified by the "good news" continues then once these Black teachers get into the profession they are likely to make it a long term career. The "good news" also suggests that the reserve pool of former teachers represents a substantial and viable source of Black teachers.

The "bad news," however, takes two forms: (1) the pattern identified by the "good news" appears to have changed slightly since the mid-1970s; and (2) there is a disproportionate drain on Black teachers who are most in demand both inside and outside the teacher labor market. The "bad news" is compounded by the

dramatic decline of beginning Black teachers since the mid-1970s. As a result, even small changes in career patterns or small differences among subgroups of Black teachers will have a large impact on their representation in the teaching force. In addition, the representation of Black teachers in the profession may shrink even more as Black women, who represent the vast majority of teachers in this sample, gain greater access to higher paying and more prestigious occupations.

FOOTNOTES

1.All of these teachers held permanent teaching certificates. I found that teachers who held temporary or provisional teaching certificates were those who had the lowest NTE test scores and tended to leave teaching permanently after only one or two years. A more thorough analysis of these teachers and the general relationship between test scores and career patterns will be the topic of a forthcoming paper.

When referring to entering cohort, I will use the calender year in which teachers began teaching, as of September. For example, teachers who began teaching in the 1974-75 school year will be referred to as the 1974 cohort.

2.Although this represents the most extensive and detailed data yet compiled on teacher career patterns, I was able to identify the length of first spell and returns to teaching only <u>within</u> North Carolina. The North Carolina Department of Public Instruction did not record information about transfers to private schools or to schools outside the state. Teachers who transferred to private schools and those who left to teach in another state, must be counted as having left teaching. Teachers who transferred to other public schools within the state, however, will be counted as having remained in teaching. Similarly, only teachers who left and returned to a North Carolina public school can be counted as having returned to teaching.

3.The statistical models I used to estimated these probabilities are known as "proportional hazard models." These models resemble the more familiar multiple regression models, but are especially designed for studying how long any critical event takes to occur. See Willett and Singer (1989) for a further details on proportional hazard modelling. Also see Allison (1982) for further information on the discrete-time method of proportional hazard modelling I employed in this study.

4.There are only seven years in the 1978-82 hazard and survival functions because teachers from these cohorts were censored in 1985-86 after only seven or fewer years.

Also, statistical tests indicated that the estimated hazard probabilities for teachers from cohort years 1974 through 1976 were the same and that the estimated hazard probabilities for

teachers form cohort year 1977 through 1982 were the same.

5.The hazard functions and the total probability of return plots contain only five years of information because an only four teachers returned after being out of teaching for six or more years.

6.This experiment assumes that those who return, teach until the seventh year after initial entry. A preliminary examination of second teaching spells indicates that most teachers who return teach for nearly four years.

7.The hazard models I used to estimate the effect of subject specialty also included control variables for length of time in teaching, entering cohort, and age-at-entry. I found no interactions between subject specialty and these other main effects.

8.Because the effect of subject specialty did not differ by entering cohort or entry age the estimates reflect the largest subgroups represented by the variables: teachers who entered between 1974 and 1977 and were between the ages of 23 and 39.

9.The hazard models I used to estimate the effect of the three-way interaction between entryage, gender, and subject also included control variables for length of time out of teaching and entering cohort as well as the main effects of entryage, gender, and subject specialty.

I found no interactions between the age/gender/subject interaction and year of interruption or between the age/gender/subject interaction and entering cohort.

10.Because the age/gender/subject interaction effect did not differ by entering cohort, the estimates in Table 2 reflect the 1975-77 cohorts.

REFERENCES

Allison, P. D. (1982). Discrete-time methods for the analysis of event histories. In S. Leinhardt (Ed.). Sociological Methodology. San Francisco: Jossey-Bass.

Allison, P. D. (1984). Event History Analysis: Regression for Longitudinal Event Data. Beverly Hills, CA: Sage Publications.

Baratz, J. C. (1986). Black Participation in the Teacher Pool. Paper prepared for the Task Force on Teaching as a Profession, Carnegie Forum on Education and the Economy.

Becker, G. S. (1975). Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education. (Second edition.). Chicago: University of Chicago Press.

Charters, W. W., Jr. (1970). Some Factors Affecting Teacher Survival in School Districts. American Educational Research Journal, 19, 1-27.

Darling-Hammond, L., Pittman, K. J., & Ottinger, C. (1987). Career Choices for Minorities: Who Will Teach? Paper prepared for the National Education Association and Council of Chief State School Officers, Task Force on Minorities in Teaching.

Feistritzer, C. E. (1985). The Condition of Teaching: A State by State Analysis, 1985. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.

Goertz, M. E. & Pitcher, B. (1985). The impact of NTE use by states on teacher selection. Princeton, NJ: Educational Testing Service.

Graham, P. A. (1987). Black Teachers: A Drastically Scarce Resource. Phi Delta Kappan, 68, 598-605.

Grissmer, D. W., & Kirby, S. N. (1987). Teacher Attrition: The Uphill Climb to Staff the Nation's Schools. Santa Monica, CA: The Rand Corporation.

The Holmes Group. (1986). Tomorrow's teachers: A Report of the Holmes Group. East Lansing, MI: Author.

Mark, J. H., & Anderson, B. D. (1985). "Teacher Survival Rates in St. Louis, 1969-1982." American Educational Research Journal, 22, 413-421.

Mark, J. H., & Anderson, B. D. (1978). "Teacher Survival Rates--A Current Look." American Educational Research Journal, 15, 379-383.

Murnane, R. J. (1987). "Understanding Teacher Attrition." Harvard Educational Review, 57, 177-182.

Murnane, R. J., & Olsen, R. J. (1987). The Career Paths of Michigan School Teachers. Paper presented at the meeting of the American Educational Research Association, Washington, DC.

Murnane, R. J., & Olsen, R. J. (1988a). How Long Teachers Stay in Teaching Depends on Salaries and Opportunity Costs. Manuscript submitted for publication.

Murnane, R. J., & Olsen, R. J. (1988b). The effects of salaries and opportunity costs on length of stay in teaching: Evidence from North Carolina. Manuscript submitted for publication.

Murnane, R. J. & Schwinden, M. (1988). Who became certified to teach and who entered teaching between 1975 and 1985? Evidence from North Carolina. Manuscript submitted for publication.

Murnane, R. J., Singer, J. D., & Willett, J. B. (1988). The career paths of teachers: Implications for teacher supply and methodological lessons for research. Educational Researcher, August-September, pp. 22-30.

Murnane, R. J., Singer, J. D., & Willett, J. B. (1989). The influences of salaries and "opportunity costs" on teachers' career choices: Evidence from North Carolina. Manuscript submitted for publication.

Schlechty, P. C., & Vance, V. S., (1982). "The Distribution of Academic Ability in the Teaching Force." Phi Delta Kappan, 64, 22-27.

Schlechty, P. C., & Vance, V. S. (1981). Do Academically Able Teachers Leave Education? The North Carolina Case. Phi Delta Kappan, 63, 106-112.

Willett, J. B., & Singer, J. D. (1988). Doing Data Analysis with Proportional Hazards Models: Model Building, Interpretation, and Diagnosis. Paper prepared for the American Education Research Association Conference, New Orleans.

Vance, V. S. (1981). The ready, willing, and academically able: A Longitudinal study of retention and attrition of North

Carolina's new classroom teachers from 1976 to 1980. (Doctoral Dissertation, University of North Carolina-Chapel Hill.) Dissertation Abstracts International, 1982, 42, 3380-A.

Whitener, J. E. (1965). An Actuarial Approach to Teacher Turnover. Unpublished doctoral dissertation, Washington University, St. Louis.

TABLE 1
Number of sample of Black teachers who began their careers in North Carolina between 1974 and 1982 by subject and gender.

Subject Specialty	Number (percent) of teachers		
	Women	Men	Total
Elementary	1703 (91.9%)	149 (8.1)	1852 (73.1)
Biology	60 (76.9)	18 (23.1)	78 (3.1)
English	220 (87.6)	31 (12.4)	251 (9.9)
Social Std.	138 (53.7)	119 (46.3)	257 (10.1)
Math	74 (76.3)	23 (23.7)	97 (3.8)
Total	2195 (86.6)	340 (13.4)	2535

Table 2
Total probability of returning to teaching within four years by subject level and entryage/gender group, and percentage of sample represented by each entryage/gender/subject group (N=782)

Entryage/ Gender Group	Probability of returning to teaching within four years (percent of sample)	
	Elementary School	High School
Men: 23 -	.467 (2.2%)	.125 (2.7%)
Women: 24 +	.371 (36.8%)	.275 (15.0%)
Women: 23 -	.278 (24.9%)	.208 (8.4%)
Men: 24 +	.092 (3.7%)	.232 (6.0%)

Figure 1. Fitted Hazard Functions by Entering Cohort

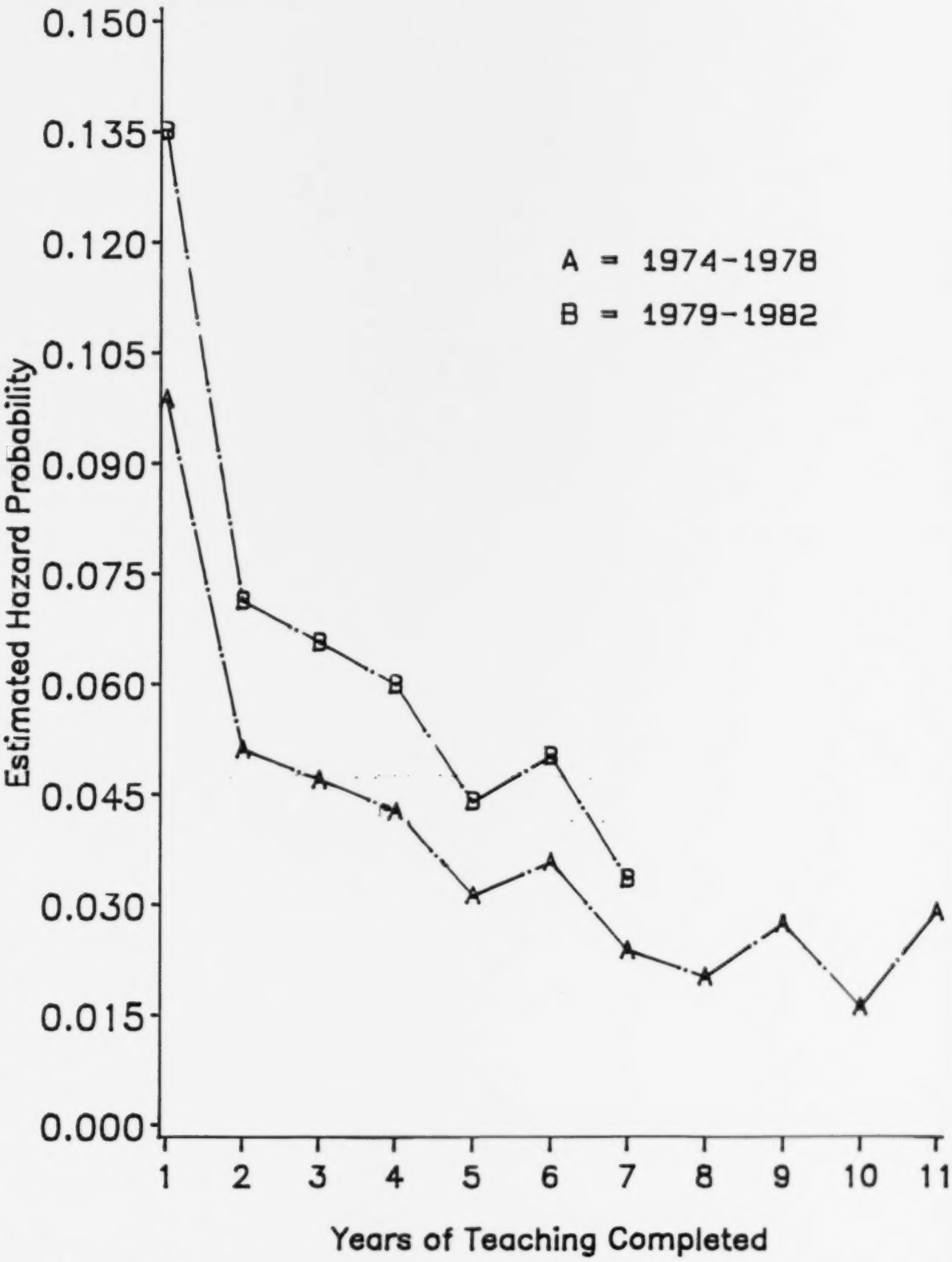

Figure 2. Fitted Survival Functions by Entering Cohort

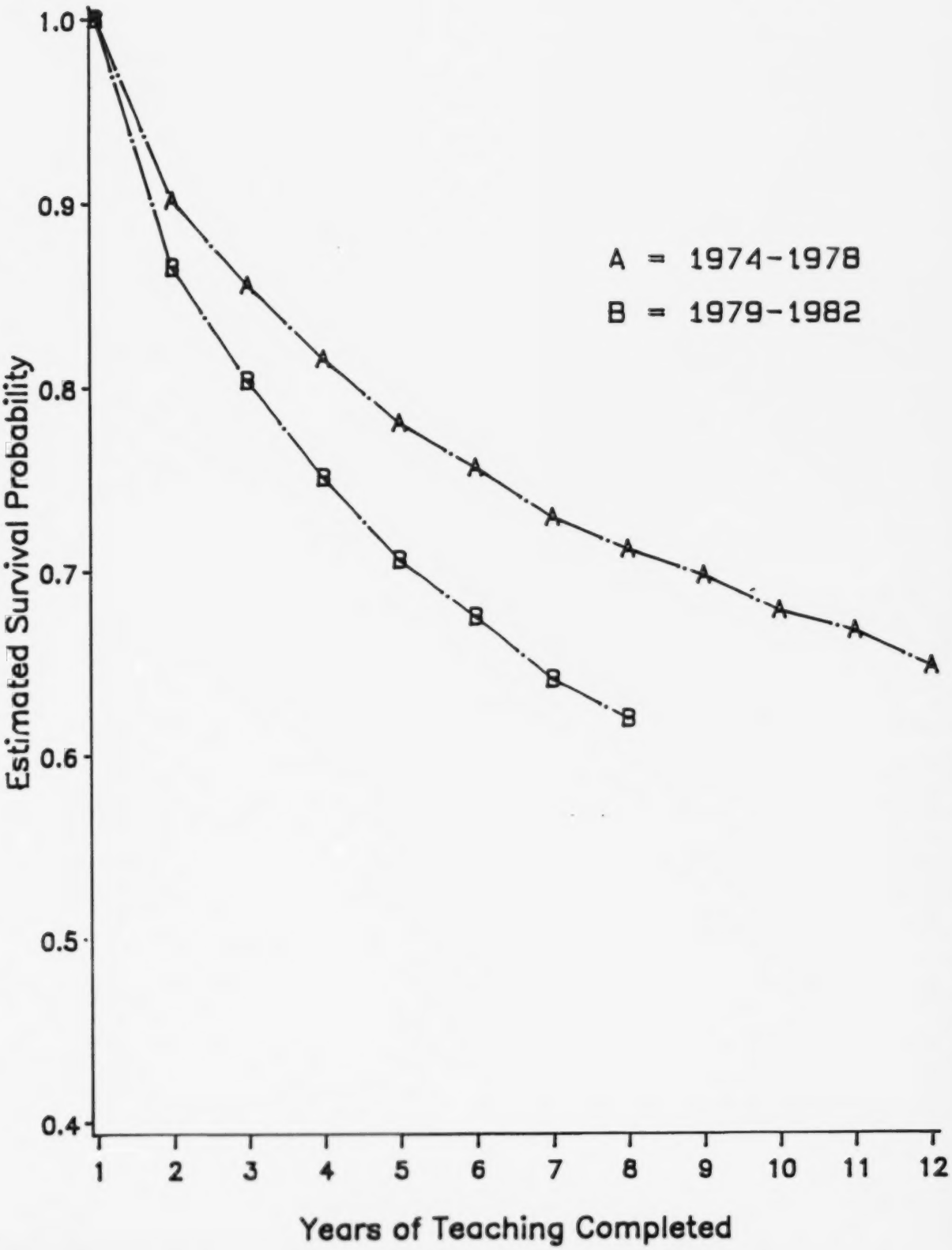

Figure 3. Fitted Hazard (Probability of Return) Functions by Entering Cohort

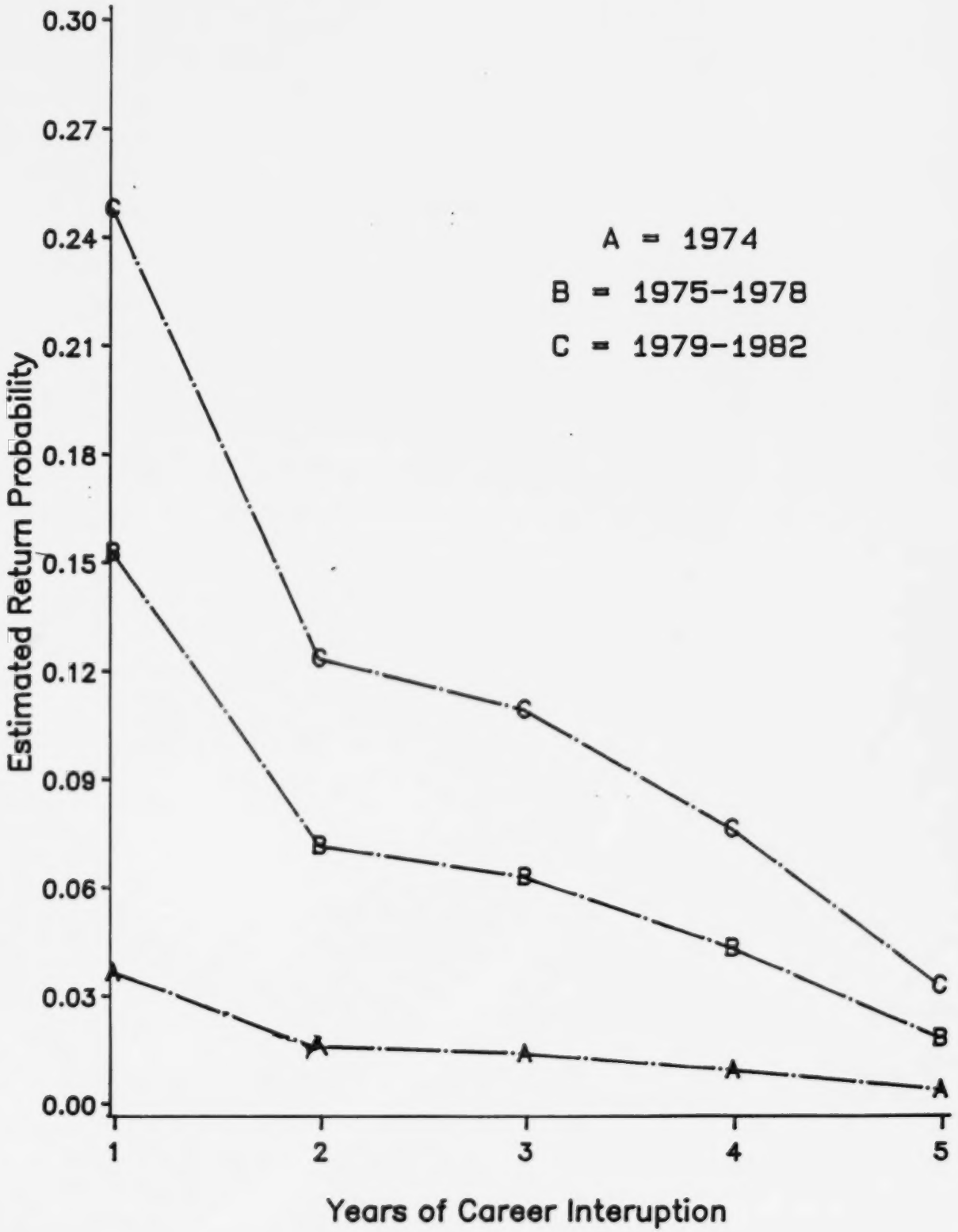

Figure 4. Total Fitted Return Probabilities by Entering Cohort

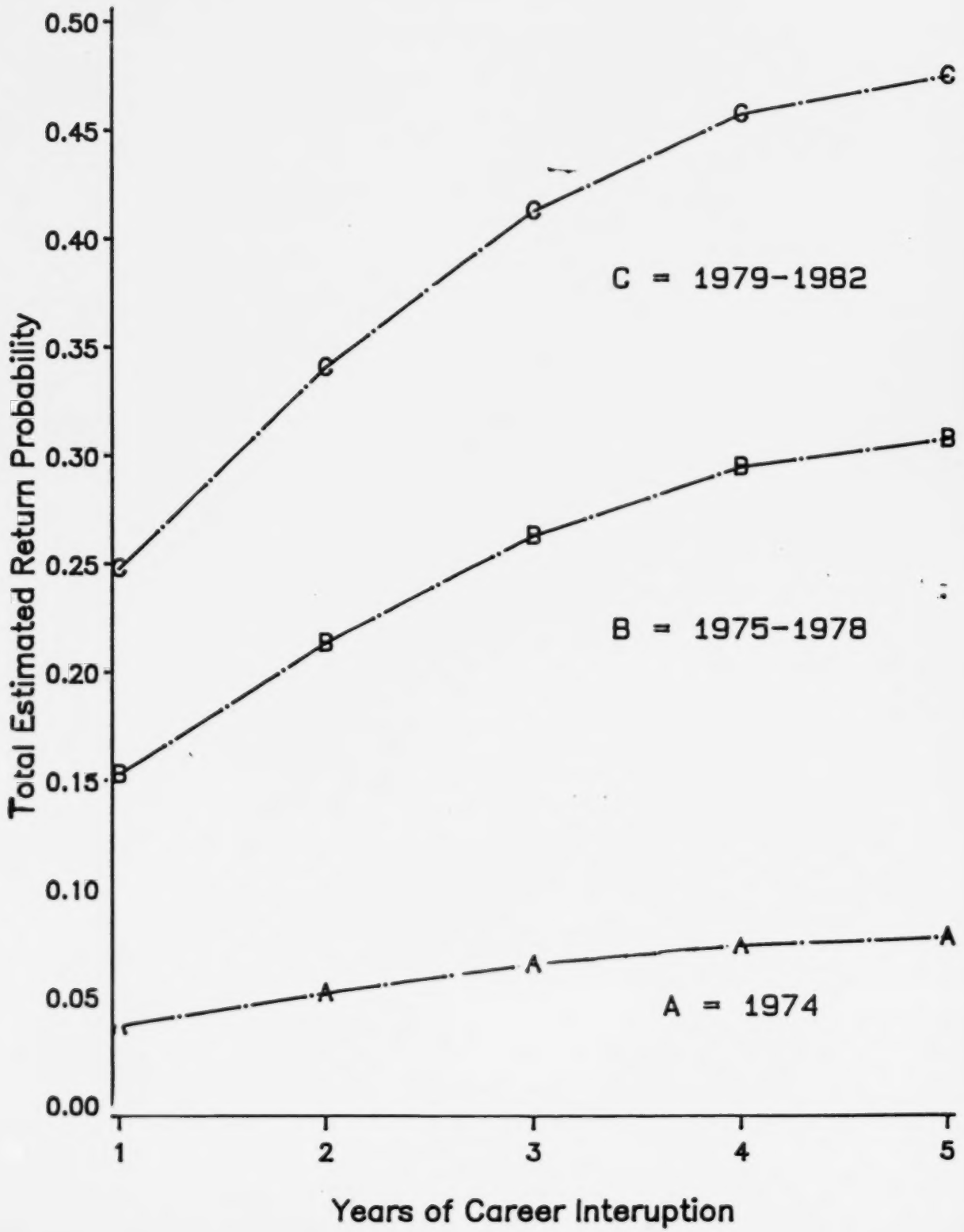

Figure 5: Fitted Survival Functions by Subject Specialty and Gender for FEMALES

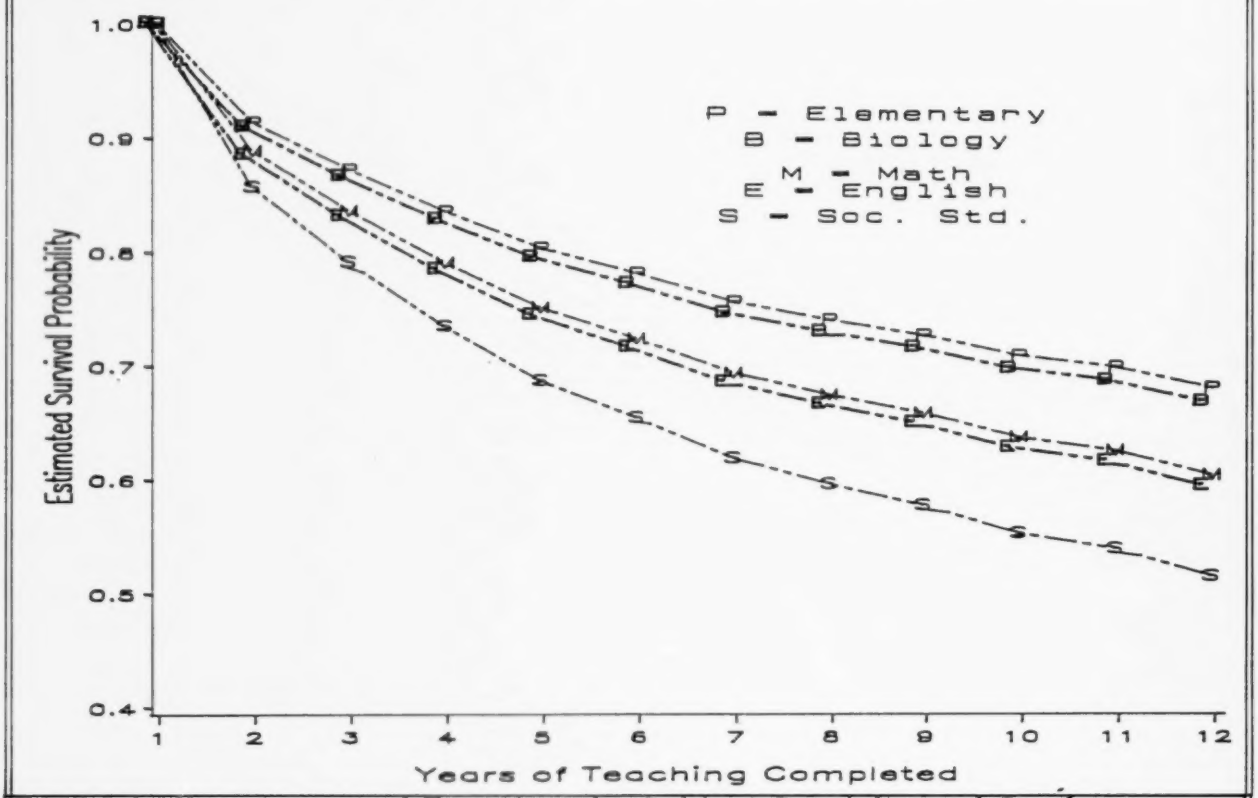

Figure 6: Fitted Survival Functions by Subject Specialty and Gender for MALES